REMARKS

The first paragraph of the specification has been amended to provide the serial number of the related application. In addition, a number of the paragraphs of the specification have been amended to correct minor typographical, grammatical and idiomatic errors that appeared in those paragraphs. Several paragraphs have also been amended to conform their descriptions to other portions of the specification, thereby improving the overall clarity of the disclosure. In this regard, the paragraph beginning at page 3, line 9 was amended to refer to the appropriate groups of the periodic chart for the corresponding elements listed. In addition, the paragraph was amended to correct the atomic symbols for Co and Zr. The amendment of "Cu" to "Co" is supported by the fact that cobalt is a Group VIIIA transition element as are the other listed elements, whereas copper is not. Similarly, the amendment of "Zn" to "Zr" is supported by the fact that zirconium like titanium is a Group IVA element, whereas Zn is a Group IIB element and thus does not belong to the same Group of the periodic chart as titanium. The paragraph beginning on page 3, line 9 was also amended to include "rare earth metals" as recited in original claim 5 and to correctly refer to the "X constituent" as the "photolabile moiety" as opposed to the "photosensitizer." The latter amendment is supported, for example, by the description found in original claim 1. A similar amendment was made to the paragraph spanning pages 3 and 4 of the specification.

The paragraph beginning at page 4, line 5 was amended to conform its description to that contained in the paragraph spanning pages 2 and 3 of the specification. Finally, the paragraph beginning at page 4, line 9 was amended to correct the formula for Si — O — M — O — Si as requested by the Examiner.

All of the foregoing amendments are supported by the specification and drawings as originally filed. Accordingly, no new matter has been added.

Turning to the claims, claims 1-15 remain in this application. Claim 15 has been withdrawn.

The various objections and rejections raised in the September 14, 2003 Office Action will now be addressed in the order raised in the Office Action.

Objections to the Specification

The referenced objections to the specification have been corrected. Further, the amended specification now provides clear antecedent basis for the inclusion of "rare earth elements" in claim 5.

Objections to the Specification

Claims 1, 5, 6 and 8 have been objected to because of a number of informalities. The informalities in those claims have been corrected. Further, claim 5 has been amended to more clearly provide that "X is a photolabile moiety taken from a class consisting of halogens and carbonyls." As "X" is already defined as a photolabile moiety in claim 1, the foregoing amendment does not further narrow the defining limitations of "X" in amended claim 5. In view of the foregoing, the objection to claims 1, 5, 6, and 8 should be withdrawn.

The 35 U.S.C. § 112 Rejections

Claims 1 and 5 have been rejected under 35 U.S.C. § 112, second paragraph, for allegedly reciting a range within a range. Claim 1 has been amended to clarify that the "organometallic photosensitizer [has] a formula R-M-X." As amended, claim 1 clearly does not claim a range within

a range. Similarly by moving the location of "photolabile moiety" in claim 5, claim 5 has been clarified and is now clearly definite.

Claim 14 has been rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite because "M" was not defined in the claim. Although claims must be construed in light of the specification of which they are apart, Applicant has now explicitly defined "M" as a metal in claim 14.

Claim 8 has been amended to properly recite "Ti" as opposed to "T."

The 35 U.S.C. § 102 Rejections

Claims 1, 2, 4-10, 12, and 14 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Lieberman et al (WO 99/06873). Applicant respectfully traverses.

Independent claim 1 claims a glass thin film derived from a thin film of photosensitive sol-gel doped with an organometallic photosensitizer, wherein the organometallic photosenitizer has a formula R-M-X, where X is a photolabile moiety, M is a metal, and R is a volatile organic compound. The thin film of photosensitive sol-gel used to form the glass thin film has a thickness in excess of one micron, is exposed to light in at least one region to unbind X constituents from M constituents of the photosensitizer within the at least one region and to bind the resulting M constituents to the sol-gel, and is heat treated to drive off the unexposed photosensitizer and unbound X constituents and to permanently bind the M constituents to a sol-gel derived glass matrix and thereby form the glass thin film. Further, the claim requires that the heat treatment be carried out in a manner that does not cause lateral shrinkage or cracking of the glass thin film.

Independent claim 14 claims a thin film of sol-gel derived glass on a silica substrate, where the thin film includes at least one metal oxide doped silica region of Si — O — M — O — Si with adjacent regions of SiO_2, where M is a metal. Further, claim 14 requires the film to have a thickness substantially in excess of one micron and be free of cracks and lateral shrinkage. Claim 14 also requires the metal oxide to be photodeposited from an organometallic photosensitizer included in the sol-gel used to form the film.

By contrast, Lieberman et al disclose a monolithic glass light shaping diffusers (LSDs) and a method for their production. In one embodiment, the LSD is formed by preparing a solution, coating it onto a substrate to produce a film layer on the substrate, causing the film layer to undergo a sol to gel transition, recording light shaping structures onto a portion of the film layer, aging the gel to form a porous glass, and heat treating the porous glass to form a non-porous consolidated glass. (*See* Fig. 7 and corresponding description at page 16, line 29 through page 17, line 9.) The film used to produce the volume LSDs of Liberman et al is 10 to 100 microns and is applied to a conventional glass substrate. (Page 16, lines 4-17.) The Lieberman et al reference also teaches the use of organometallic photosensitizers having a formula R-M-X in combination with photolithography to record the light shaping structure in the LSDs. (Page 12, line 24 through page 13, line 32.) The heat treatments taught in the Lieberman et al reference includes a 700 °C heat treatment followed by a heat treatment at the consolidation temperature of the glass (typically about 1,000 °C to 1050 °C) to form a fully dense glass optical material. (Page 14, lines 3-14.)

As noted in Liberman et al., significant shrinkage (on the order of 30-40%) occurs during the heat treatment. (Page 14, lines 15-16.) Lieberman et al also specifically teaches that such shrinkage improves the optical qualities of the LSD. (Page 14, lines 15-29.) Lieberman et al further teaches

that such shrinkage occurs not only in the context of cast volume LSDs, but that it also occurs in surface LSDs produced by casting as described in Section 3 of Liberman et al as well as in the surface or volume LSDs produced by coating process described in Section 5 of the Liberman et al reference. (Page 14, lines 29-32.)

While shrinkage in the context of volume LSDs may improve the optical qualities of the resulting volume LSD, in the context of the thin films of the present invention, such shrinkage is detrimental and tends to form cracks in layers having a thickness suitable for forming integrated optics devices, which is typically 1-10 microns. Thus, one significant difference between the thin films claimed in the present application and the volume LSDs described in Lieberman et al. is that the thin films of the present invention are formed without lateral shrinkage or cracking. This is completely contrary to the teachings of Lieberman et al.

In view of the foregoing, independent claims 1 and 14 are neither anticipated by or obvious in view of the Lieberman et al reference. Moreover, because claims 2, 4-10, and 12 depend from independent claim 1, they are also allowable over the Lieberman et al. reference.

The 35 U.S.C. § 103 Rejections

Claims 11 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Lieberman et al, and claim 3 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Lieberman et al in view of Fardad et al (6,054,253). Applicant respectfully traverses.

Claim 11 depends from claim 1 and is thus allowable for the same reasons noted above with respect to claim 1.

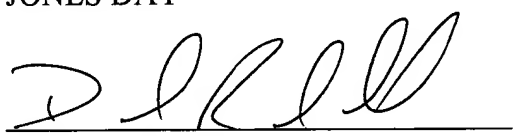
Similarly, claim 3 is patentable over Lieberman et al for the reasons noted above in connection with claim 1. Further, Fardad et al. does not teach or suggest the limitations lacking in the Lieberman et al reference. Indeed, contrary to the Examiner's statements, one skilled in the art would not combine the teachings of Lieberman et al. with Fardad et al., particularly with respect to the use of a silicon substrate, as such a substrate would defeat the purpose of the LSDs described in Lieberman et al. Such a combination would defeat the purpose of the LSDs as it would prevent light from passing through the LSDs

CONCLUSION

In view of the foregoing, reconsideration and allowance of this application are earnestly solicited.

Respectfully submitted,

JONES DAY

Dated: September 20, 2004 By: 

David A. Randall
Reg. No. 37,217

555 West Fifth Street, Suite 4600
Los Angeles, California 90013-1025
Telephone: (213) 489-3939
Facsimile: (213) 243-2539